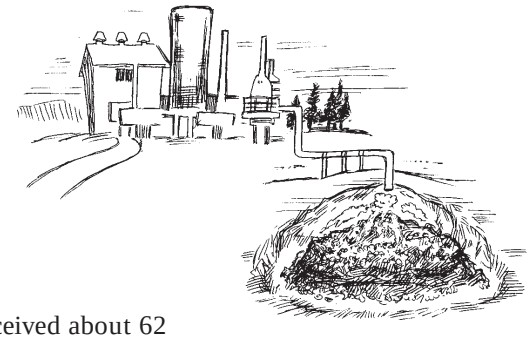
Landfill Methane Recovery



EPA's State and Local Climate Change Program helps build awareness, expertise, and capacity to address the risk of climate change at the state and local levels. The program provides guidance and technical information to help state and local agencies prepare inventories of greenhouse gas emissions, develop action plans to reduce emissions, and educate their constituents. By emphasizing the many economic and environmental benefits of greenhouse gas reductions, the program encourages state and local decisionmakers to implement voluntary measures to reduce their greenhouse gas emissions.

Energy from Landfill Gas

Landfills are the single largest human source of methane emissions in the United States. In an anaerobic (oxygen-free) environment, methane is produced by the bacterial decomposition of organic materials such as yard waste, household waste, food waste, and paper. Methane creates an explosion hazard in landfills, and it is a powerful greenhouse gas that helps exacerbate global warming. Landfill gas also contains volatile organic compounds that contribute to ground-level ozone.

Methane emissions from U.S. landfills in 1996, the most recent year for which data are available, were 65.1 million metric tons of carbon equivalent. This figure represents a 16 percent increase since 1990 due to the steady accumulation of wastes in landfills. Emissions from U.S. municipal solid waste landfills, which received about 62 percent of the solid waste generated in the United States, accounted for 93 percent of total landfill emissions. Industrial landfills accounted for the remainder.

Approximately 14 percent of the methane generated in U.S. landfills in 1996 was recovered and combusted, often for energy. The U.S. Environmental Protection Agency currently is reviewing site-specific information on landfill gas recovery and anticipates that this new information will lead to an estimate of greater methane recovery nationwide and lower net methane emissions.

The Clean Air Act requires many landfills to collect and burn their landfill gas emissions. Once the gas is collected, landfill owners and operators can either flare the gas or burn it to produce energy for sale or for use at the landfill site. Both options address local air quality and safety concerns, but only energy recovery can capitalize on the energy value of landfill gas and displace the use of fossil fuels. Offsetting the use of coal and oil to generate electricity or heat reduces emissions of greenhouse gases and pollutants, including sulfur dioxide, a major contributor to acid rain.

Because landfill gas is generated continuously, it provides a reliable fuel for a range of energy applications, including power generation and direct use. Electric utilities that participate in landfill gas-to-energy projects can benefit by enhancing customer relations, broadening their resource base, and gaining valuable experience in the development of renewable energy technologies. In a competitive utility environment, landfill gas can provide part of an electricity provider's green power portfolio. Industrial facilities, universities, hospitals, and other large energy users also can benefit by tapping directly into

BENEFITS OF LANDFILL GAS-TO-ENERGY PROJECTS

- Reduce cost of compliance with federal regulations.
- Create jobs.
- Reduce explosion hazard at landfills.
- Reduce emissions of methane, a powerful greenhouse gas.
- Reduce formation of smog.
- Displace electricity produced by fossil fuels, further reducing pollution.

landfill gas from local landfills. They can burn the gas to provide their own heat, hot water, or electricity.

The sale or use of landfill gas often lowers the landfill owner's overall cost of compliance with Clean Air Act requirements, and, when conditions are favorable, the owner may realize a profit. Landfill gas-to-energy projects also may create jobs related to the design, operation, and manufacture of energy recovery systems and lead to advancements in U.S. environmental technology. Local communities will benefit, in terms of both jobs and revenues, through the development of local energy resources at area landfills.

Landfill gas is a local, renewable energy resource. Using landfill gas for energy offers significant environmental, economic, and energy benefits to landfill owners and operators, project developers, energy product purchasers and consumers, and communities living near landfills.

The Federal Role

Methane emissions from landfills are regulated under the Clean Air Act through the landfill New Source Performance Standards and Emissions Guidelines. These guidelines were promulgated by the U.S. Environmental Protection Agency in 1996. For the full text of the landfill rule, see the Federal Register, March 12, 1996 (Volume 61, Number 49), 40 CFR Parts 51, 52, and 60. The performance standards and emissions guidelines also are available on the EPA Landfill Methane Outreach Program website (see address below).

All municipal solid waste landfills that were active on or after November 8, 1987, are potentially affected by the landfill rule. Affected municipal solid waste landfills must collect and burn their landfill gas. There are two compliance options under the rule: installation of a landfill gas collection system and flare, or installation of a landfill gas collection system and an energy recovery system.

EPA helps owners and operators examine the options for profitable gas-to-energy applications through its Landfill Methane Outreach Program (LMOP). The LMOP's mission is to reduce methane emissions from landfills by lowering the barriers to and encouraging development of environmentally and economically beneficial landfill gas-to-energy projects. The program works with state agencies, energy providers, industries, trade and public sector organizations, communities, municipalities, and landfill owners and operators.

State Experience with Landfill Methane Recovery

State allies in EPA's Landfill Methane Outreach Program agree to promote the program, work with EPA to review and explore opportunities to overcome any unnecessary regulatory, administrative, and other barriers to the widespread adoption of energy recovery at landfills. They also agree to consider promotion of policies, mechanisms, and incentives that recognize the full environmental, energy, and economic value of energy recovery and increase the competitiveness of landfill gas as an energy resource. Further, state allies agree to form a task force, develop and distribute state-specific outreach materials, and appoint a Landfill Methane Outreach Coordinator. The program is developing a handbook of state resources and options for developing landfill gas-to-energy projects. Contact the Landfill Methane Outreach Program Hotline for more information (see phone number and website address below).

Missouri

The Missouri Department of Natural Resources established a fund to provide low-interest loans to public schools, local governments, and small businesses for energy efficiency and renewable energy projects. Using a $150,000 loan from the fund, Pattonville High School in St. Louis County retrofitted the school's boilers to run on methane and installed a 1,600-foot pipeline from the school's boilers to a nearby landfill. In a good-neighbor gesture, the landfill owner offered the recovered landfill methane to the school free of charge and installed a pipeline from the landfill gas recovery system to the end of the landfill, connecting it with the school's pipeline. The rest of the money for the project came from the St. Louis County Solid Waste Commission. The project is expected to yield annual energy savings of $40,000.

Washington

Washington State enacted legislation in 1998 that exempts electric generating facilities powered by landfill gas and other renewable sources from state sales and use taxes. The exemption reduces taxes on electric generating facilities by 7.5 to 8 percent, depending on how local governments in the state apply sales tax. The exemption includes installation costs and is limited to facilities capable of generating more than 200 kilowatts of electricity. Other states, including Arizona, Massachusetts, New Jersey, Iowa, and Minnesota, have similar sales or use tax exemptions for renewable energy power or equipment.

For More Information

The U.S. Environmental Protection Agency's Landfill Methane Outreach Program encourages the use of landfill gas as an energy resource. The program helps state agencies, utilities, municipal and private landfill owners and operators, and tribes reduce methane emissions from landfills through the development of profitable landfill energy recovery projects.

Tel: 888-782-7937

Website: *http://yosemite.epa.gov/methane/home.nsf/pages/lmop*

EPA's State and Local Climate Change Program helps states and communities reduce emissions of greenhouse gases in a cost-effective manner while addressing other environmental problems.

Website: *http://www.epa.gov/globalwarming/ and click on "Public Decision Makers" under the "Visitors Center."*